

IN THE CLAIMS

Claims as they presently stand.

1. A method of forming copper interconnect, comprising:
forming a dielectric layer over a substrate, the dielectric layer having trenches therein;
forming a copper diffusion barrier at least in the trenches;
depositing copper over the copper diffusion barrier and over a top surface of the dielectric layer; and
polishing the copper with a high pH slurry having less than or equal to 10 wt% of abrasive.
2. The method of Claim 1, wherein the dielectric layer comprises an oxide of silicon, and the copper diffusion barrier is electrically conductive.
3. The method of Claim 1, wherein the dielectric layer comprises a fluorinated oxide of silicon, and the copper diffusion barrier is selected from the group consisting of tantalum, and tantalum nitride.
4. The method of Claim 1, wherein the high pH slurry has a pH between approximately 7.5 and 12.
5. The method of Claim 4, wherein the high pH slurry has a pH between approximately 8 and 11.5.

6. The method of Claim 1, wherein the slurry contains approximately 2% to 10% by weight of SiO_2 .
7. The method of Claim 1, wherein the slurry contains an oxidizer comprising $(\text{NH}_4)_2\text{S}_2\text{O}_8$.
8. The method of Claim 1, wherein polishing comprises chemical mechanical polishing with a down force of less than or equal to approximately 3.75 psi.
9. The method of Claim 1, wherein polishing comprises:
engaging the copper with a polishing pad with a down force less than or equal to 3.75 psi;
and
providing a slurry flow rate of approximately 200 ccm.
10. The method of Claim 9, wherein polishing further comprises an orbital speed of approximately 310 rpm and a wafer rotational speed of approximately 10 rpm.
11. A method of polishing a copper film, comprising:
polishing the copper film with a slurry having a pH and composition such that a protective layer is formed over the copper film during polishing.
12. The method of Claim 11, wherein the pH is the range of approximately 8 to 11.5.
13. The method of Claim 12, wherein the slurry comprises a precipitated SiO_2 .

14. The method of Claim 13, wherein the precipitated SiO₂ comprises approximately 2 to 10 wt% of the slurry.

28. A method of polishing a copper film comprising:
polishing said copper film with a slurry having a high pH and an abrasive in the amount of less than 10% by weight.

29. The method of claim 28 wherein said slurry has a pH between 7.5 and 12.

30. The method of claim 29 wherein said slurry has a pH between 8 and 11.5.

31. The method of claim 28 wherein said slurry contains approximately 2% - 10% by weight of said abrasive.

32. The method of claim 28 wherein said slurry contains approximately less than 5% by weight of said abrasive.

33. A method of polishing a copper film comprising:
polishing the copper film with a slurry comprising:
an abrasive in the amount between 2-10 wt% of said slurry;
an oxidizer;
a corrosion inhibitor; and
a pH between 8 and 11.5.